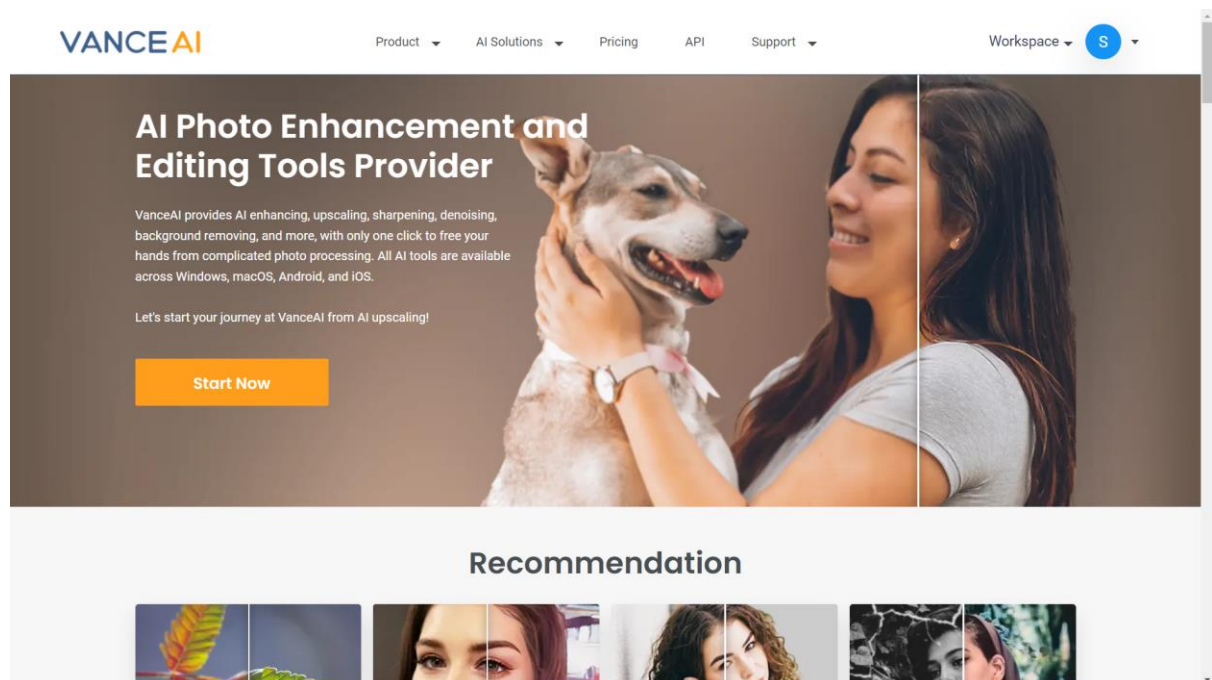# EE604 – ASSIGNMENT 3

PART – 1: SW

The image Processing Software used is: **VANCE AI**

URL:
https://vanceai.com/?medium=top_nav_logohttps://vanceai.com/?medium=top_nav_logo

There are a number of Image Processing features available in the software.

The above photo shows the diversity of the features available in the software. Out of all these features, I was highly intrigued by the

AI Photo Restorer feature.

AI PHOTO RESTORER

The AI photo restorer feature helps to restore old photos. Basically an old photo has a lot of scratches in it and the face might not be visible clear enough. The software helps to remove the scratches from the photo and improves the image quality.
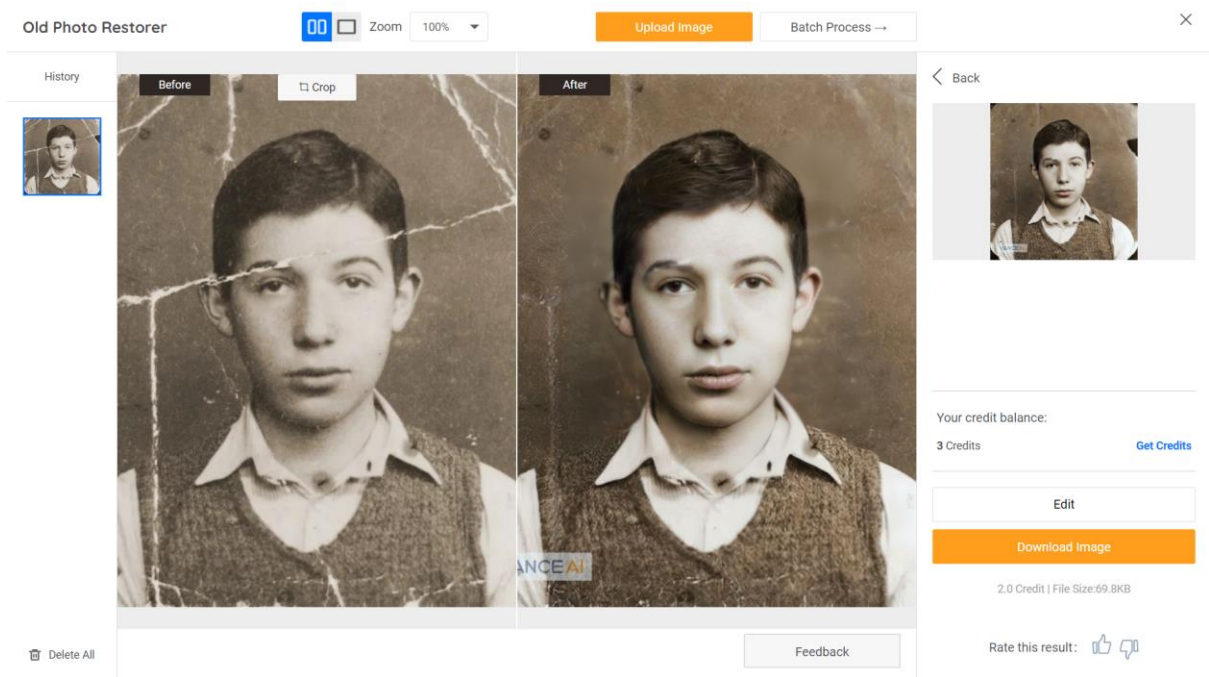
The above image depicts how the image restorer works:

Original Image   Processed Image

As can be seen all the scratches are removed and the image is enhanced making it much better.

There are various other features. Out of them some are shown below.

IMAGE COLORIZER

This feature helps to automatically convert black and white images into colored(RGB) images using AI. An example has been shown below.
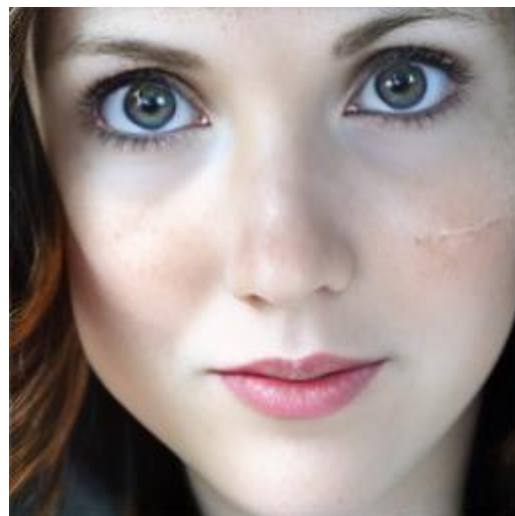

Original Image

Colored Image

FRECKLE REMOVAL

The feature helps to enhance the image of faces by removing freckle and any kind of dark spots from the image. An example has been shown below.

Original Image

Processed Image

OBJECT REMOVAL

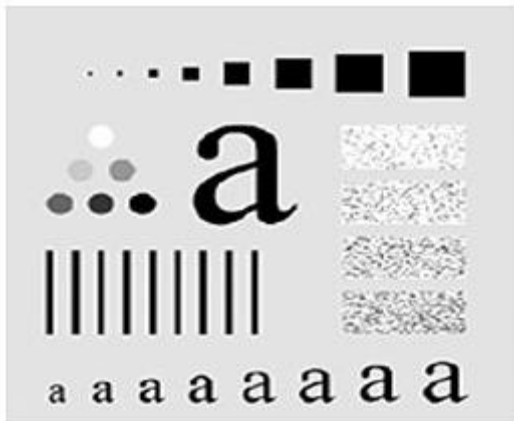This feature removes object in images without hampering the continuity in our image

Original Image

Processed Image

PART – 2: Q4Q

Analytical Question

Original Image(O)

(a)   (b)   (c)

Aryan has three box kernels: i) 23x23, ii) 25x25, iii) 45x45. Aryan convolved the kernel on the original image (O) and obtained these as the outputs. Match the output with their possible kernel size.

Now explain: The vertical lines in the image (a) and (c) are well separated and can be distinguished properly. But in (b) the vertical lines cannot be distinguished. Explain Why. Given that each vertical bar is 5 pixel wide, 100 pixels high and the separation between the bars is 20 pixels.

Ans: a – 23x23, b – 25x25, c – 45x45
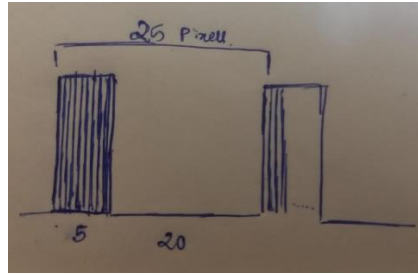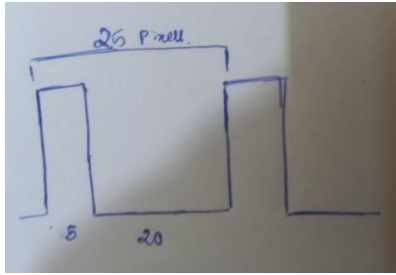
The above picture shows a zoomed in version of a vertical bar. The distance in pixels between the onset of one bar and the onset of the next one is 25 pixels. Now the output of a box filter is the average of all the pixels that it is placed upon.

Consider the 25x25 kernel. Once the kernel moves over the image, it loses one value of the vertical bar on the left but it picks up an identical one on the right, so the response doesn't change. Thus, number of pixels belonging to the vertical bars and contained within the kernel remain the same irrespective of the location of the kernel(until it is within the bars). This coincidental similar separation and kernel size caused the high amount of blur even for a low kernel size. This constant response is the cause of no white gaps in the output.

MCQ:

1) Which of the following statement(s) is(are) correct
    a) Generally sampling is done before region growing because sampling points give the seed points.
    b) In region splitting and merging, splitting stops when no more similarities can be found in leaf quad images.
    c) Variance in Quad images can be used as a merging criteria for region splitting and merging.
    d) In K-Means clustering convergence is always guaranteed at the global minima.

Ans: (ABC)

2) Which of the following are correct?
   a) Sobel edge detector is highly sensitive whereas Prewitt edge detector is robust to noise.
   b) In region splitting and merging, in the final output the regions can overlap.
   c) In pyramid construction, to up-sample an image, zero padding is used along with interpolation.
   d) In mean-shift segmentation we put a small probability mass around each data-point via kernel, to do so, any radially symmetrical kernel can be used.
   e) In a hybrid median filter, the central pixel is inherently given more weight.

ANS: (CDE)

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------------------------------THANK YOU--